REFERENCE	DESIGN	RECRUIT-MENT	CASE DEFINITION	SUBJECTS	ASSESSMENT TOOLS	RESULTS	AUTHOR'S CONCLUSIONS
Fujiki N, Naito Y, Nagamine T, Shiomi Y, Hirano S, Honjo I, et al. Influence of unilateral deafness on auditory evoked magnetic field. Neuroreport. 1998;9(14): 3129–33.	Group comparisons; subjects with varying onset of UHL* compared with controls	Not reported	Average hearing loss of all 17 UHL subjects (.25, .5, 1, 2, 4 kHz*) = 106.8 dB* HL.*	17 UHL subjects mean age 37.4 years. Profound UHL of varying durations: 1 week to 43 years. (5 subjects had a range in duration of 1–5 weeks; 4 subjects had a range in duration of 2–6 weeks; 4 subjects had a range in duration of 4–6 years; and 6 subjects had a range in duration of 15–43 years.) 14 controls; mean age 27.6 years.	N100m* recordings from MEG* were used to measure physiological differences between mid-brainstem auditory nuclei in unilateral hearing loss subjects relative to the control group. Two half second evoking stimuli were 1 kHz pure tone and the Japanese vowel /a/.	Changes in the latency of the waveform occurred about one month after unilateral deafening. Reorganization/ adaptation occured as a result of the hearing loss even in adults. The changes were central to the inferior colliculus based on results from guinea pigs. Ipsilateral-contralateral neuronal differences in the auditory cortex were not affected by unilateral deafening; differences were observed with greater ipsilateral activity in congenitally UHL subjects. MEG responses from contralateral stimulation were different between subjects with acquired UHL and those with congenital UHL.	Neural reorganization occurs in the human brainstem with the loss of hearing in one ear; reorganization occured in congenital and acquired cases. Differences are observed in the brainstem and cortex in subjects born with profound UHL.

* UHL = unilateral hearing loss; kHz = kilohertz; dB = decibel; HL = hearing level; PTA = pure tone average; N100m = a type of waveform; MEG = magnetoencephalogram

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Hartvig Jensen J, Johansen PA, Borre S. Unilateral sensorineural hearing loss in children and auditory performance with respect to right/left ear differences. Br J Audiol. 1989;23(3): 207–13.	Case-matched control.	39 children age 10–16 years with UHL* recruited from audiology department records. 30 selected based on case definition.	*Cases:* 1) Aged 10–16 years. 2) Good ear: <15 dB* HL*, PTA* .5, 1, 2, 4 kHz*) with monaural word discrimination score above 90%; worse ear >45 dB. 3) Tympanograms normal bilaterally. 4) Normal IQ. 5) UHL for more than 3 years. 6) Trauma or meningitis ruled out. *Controls:* 1) Normal hearing <15 dB HL from .25 to 8 kHz and normal WDS*. 2) Tympanograms normal bilaterally. 3) No recurrent episodes of otitis media. 4) Normal IQ.	30 UHL children; 19 left side UHL (L-group); 11 right side UHL (R-group). 30 Controls matched for age and sex.	WDS at most comfortable level in: Monaural, direct (signal to good ear and speech noise to impaired ear) in (i) quiet, (ii) SNR* +10 dB, and (iii) SNR 0 dB. Monaural, indirect (signal to impaired ear and speech noise to good ear) in (i) quiet, (ii) SNR +10 dB, and (iii) SNR 0 dB. Interrupted speech in free field in monaural, direction in (i) quiet, (ii) SNR +10 dB, and (iii) SNR 0 dB.	WDS for monaural direct: As background noise introduced, WDS dropped, but no difference between groups found. WDS for monaural indirect poorer than for direct; these differences when compared to controls were significant even in quiet: $p < .05$ for L-groups, $p < .01$ for R-group. At SNR 0 dB difference in performance compared to controls $p < .001$ for both UHL groups, however R-group performed better than L-group for SNR +10 dB. 3 groups performed equally in interrupted speech in quiet, but after interruptions of 8 seconds the scores dropped severely. Discrimination scores (75% and 30%) in SNR +10dB In SNR +10dB condition controls performed better than R- and L-groups. Also found L-group performed better than R-group. At SNR 0dB some trends with L-group performing better than R-group.	Results confirmed superiority of binaural over monaural hearing for speech discrimination. Confirmed Bess's results that UHL children perform WDS tests more poorly than controls even in quiet when signal comes from impaired side. Ear difference found in SNR 0 dB condition only.

* dB = decibel; HL = hearing level; PTA = pure tone average; kHz = kilohertz; WDS = word discrimination score; SNR = signal-to-noise ratio

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Schmithorst VJ, Holland SK, Ret J, Duggins A, Arjmand E, Greinwald J. Cortical reorganization in children with unilateral sensorineural hearing loss. Neuroreport. 2005;16(5):463–7.	Within-group comparisons.	Recruited from the Center for Hearing and Deafness Research at Cincinnati Children's Hospital Medical Center.	UHL*: 1) PTA* >65 dB* HL* and no frequency < 45 dB HL at .5–4 kHz*. 2) PTA ≤15 dB HL in the better ear and no frequency >25 dB HL. All subjects had idiopathic hearing loss with normal CT* scans, no history of infections (e.g. meningitis or cytomegalovirus), family history, or trauma.	8 subjects with UHL. 4 boys, 4 girls. 4 right UHL, 4 left UHL. 7–12 years (Mean: 9 years). No difference in mean age between right and left UHL subjects. All sensori-neural losses.	fMRI* scans with paradigm of listening to random tones monaurally.	Robust activation found bilaterally in the auditory cortex. Unexpected activation was seen in the inferior frontal gyrus bilaterally and in the cuneus. This might indicate cortical reorganization for left and right UHL subjects but needs further study. Subjects with <u>left</u> UHL displayed greater activation in the right superior temporal gyrus. Subjects with <u>right</u> UHL displayed greater activation in the left inferior frontal area immediately anterior to the superior temporal gyrus.	Results provided preliminary evidence of disparate neural circuitry supporting auditory processing in participants with left and right UHL. The "right ear advantage" (i.e. left UHL is better than right UHL) was due to an early cortical reorganization in participants with right UHL toward left frontal area, with the contralateral pathways for language processing having been disrupted. However, these areas became more relevant for language processing with increasing age, as language function became more left-lateralized, necessitating an additional cortical reorganization of ipsilateral auditory pathways. Further research, especially longitudinal studies is needed.

* UHL = unilateral hearing loss; PTA = pure tone average; dB = decibel; HL = hearing level; kHz = kilohertz; CT = computed tomography (imaging technique) ; fMRI = functional magnetic resonance imaging